

Georges Canguilhem: philosopher of disease

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We all think we know what we mean by disease; a morbid condition of the body or mind which has distinguishable symptoms and signs, together with a discernible natural history. We learn about disease in the context of cells, individuals, and populations. Together, these settings provide us with a complete pathological description of each condition, a map that illustrates a biological, clinical, and public health topography for the physician to discover centres of meaning and routes of management. We know that this method is sound. After all, we are doctors, and disease is our business.

Yet our received notions of what constitutes 'disease' are now being strenuously challenged within disciplines ranging from psychiatry (drugs to alter unwanted personality traits¹) to oncology (cancer-determining genes identified decades before any presenting disease²). What does morbid really mean? Perhaps we should abandon the idea of disease altogether and focus on an all-encompassing notion of health as a state of perfect physical, mental, and social well-being³. Such a definition gives medicine a crusading appeal, an idealistic strategy for eliminating any element that threatens this utopian goal. However, how justified are we in making these assumptions about the meaning of health and disease? The issue of which human states can be called pathological and which can be called normal is central to modern medicine. For instance, is an individual with a genotype that predicts subsequent development of Alzheimer's disease normal?

The French physician, Georges Canguilhem, has made the subject of normality the focus of his philosophical writings. Although not widely known outside France, recent new and republished English translations^{4,5} of his work, together with several reviews and critical summaries⁶⁻¹⁰, allow us to study his thoughts in closer detail and to re-examine contemporary questions about the normal and the pathological in the light of his ideas.

FROM RESISTANCE TO RESISTANCE

Canguilhem was born in Castelnaudary, France, on 4 June 1904. Aged 20, he entered the elite Ecole Normale

Supérieure in Paris, where his first writings were on the positivist, Auguste Comte. It was here that he became interested in the relation between the rational sciences and society. In 1930, after a short period of military service, he was appointed as a teacher to several provincial lycées (a requirement for all fortunate recipients of an ENS education) before becoming editor of the radical journal, *Libres Propos*. There he continued his activities of 'discreet impertinence'⁵ by defending the rights of conscientious objectors, a group much vilified by the existing government. Although a committed pacifist (he purposely failed an examination for officer training in 1927 by dropping a rifle on the foot of his examiner) Canguilhem felt compelled to join the French Resistance movement with the rise of German National Socialism. He re-directed his energies to writing anti-fascist polemics about the consequences of fascist dictatorship in Germany and Italy.

In 1936 in Toulouse, he began his medical studies while still teaching, but 4 years later he resigned his university position because he refused to work for the Vichy government. To escape the Vichy regime he moved to Strasbourg to concentrate on his medical degree, and in 1943 produced his doctoral dissertation in medicine: *The Normal and the Pathological*⁴. Later that year, Canguilhem narrowly avoided capture by the Gestapo when German forces violently entered the University of Strasbourg, killed two professors, and transported students and faculty members back to Germany. He became active in the Résistance and his perilous work earned him the Military Cross and the Médaille de la Résistance.

After the war he returned to Strasbourg, but from 1948-1955 he assumed the prestigious title of Inspecteur Général de Philosophie and oversaw teaching at French lycées. In 1955, he became professor of History of Sciences at the Sorbonne, where he developed a reputation as a terrifying examiner, and director at the Institute of the History of Science and Technology in Paris. He wrote and published iconoclastic essays and terse critical reflections on the philosophy of medicine and he produced original historical studies of the reflex, thyroid, and 'the role of analogies and models in biological discoveries'. He retired in 1971 but continued to write extensively throughout the 1970s and early 1980s.

THE PHILOSOPHY OF PATHOLOGY

Canguilhem's interest is the evolution of medical knowledge. He contrasts two ways of looking at the history of medicine. One involves the chronological documentation of factual progress while the other seeks to identify the far more obscure development of concepts. Canguilhem emphasized the priority of concepts over facts because of their explanatory power and practical value. He studied how ideas developed, matured, and superseded one another, and argued that on each accepted conceptual framework hung an ideology of scientific belief. For example, the notion that an infectious pathogen causes a disease drives a programme (a scientific ideology) to treat that disease by eliminating the pathogen or preventing its transmission to the host.

Progress in medicine depends on refining theories that include cause and effect relations and which therefore provide a basis for intervention. These theories always contain some measure of error. Yet,

... error is inevitable in the pursuit of scientific truth. To study the history of a theory is to study the history of a theorist's doubts⁵.

Given that the study of concepts is a powerful means of studying how physicians acquire practical knowledge, what methodology does Canguilhem use to discover these acquisitive skills? His method is fundamentally historical but with a twentieth-century twist. Canguilhem fuses philosophy ('the questioning of received solutions') with history in his evaluation of conceptual progress in medicine. The history of medicine becomes a branch of epistemology, in the French sense of 'studies concerning the nature, structure, and method of the sciences'¹¹: according to Canguilhem '... the history of science is not only science's memory but also epistemology's laboratory'. The 'history' of medicine is no longer some arcane and literal discussion about scientific progress but a vital debate about the evolution of scientific ideologies. His approach is deeply provocative to traditional empirical science:

It should come as no surprise that it was positivism, a philosophy of history based on a generalization of the notion that theory ineluctably succeeds theory as the true supplants the false, that led to science's contempt for history⁵.

Canguilhem developed this philosophical outlook to understand how medicine establishes norms of human function. The concepts of normality and the norm are at the heart of Canguilhem's work. He saw the history of medicine as a continual conflict between descriptive (the act of producing evidence free of values) and normative (the interpretation of evidence according to a set of values) forces. The application of experimental methods to medicine

led to a laboratory and animal-based research method that rejected purely descriptive traditions. Results were meaningful only so far as they supported cause and effect (normative) conclusions. Motivations among researchers driven by this approach have occasionally produced disastrous results. For instance, although Robert Koch was hailed for his discovery of *Mycobacterium tuberculosis* in 1882, his subsequent rush to report a cure with what turned out to be tuberculin produced a dramatic and embarrassing reversal in his fortunes¹². The quest to acquire meaningful data led medical scientists to develop quantitative methods for interpreting results in terms of averages (the true meaning of 'norm'). Advocates of this mathematical approach aimed to replace the intuitive judgements of physicians with sound statistical reasoning. There is an ironic modern resonance to this history with the sometimes tyrannical language that comes from members of an increasingly powerful statistical community¹³.

However, the intellectual conflict between experimental medicine and armchair reflection is not so easily resolved. Canguilhem argues forcefully that experimental medicine is inextricably intertwined with rational conceptualization (even when made from the armchair). Data lead researchers to formulate theories that are themselves validated or falsified in the light of further experimental data. Empiricism and rationalism are not opposing methods; they are the interdependent processes that make up the science and practice of medicine.

Canguilhem applies this argument to the twin concepts of health and disease. Normality is usually defined from limits derived from population data: e.g., 'normal' laboratory values. This statistical definition of normality implies that abnormality—pathology or disease—is simply an excess or deficit of a particular variable. Science has privileged these mathematical approaches to more qualitative judgements. This numerical methodology is believed to have strengthened the biological sciences and is the foundation of modern scientific medicine.

Yet Canguilhem categorically rejects such a view. He regards normality and health as being functional characteristics of the whole organism. He defines health as the ability of the organism to adapt to challenges posed by the environment, to create new norms for new settings. For him, normality is measured by the adaptability of the individual; the physiological parallel is autoregulation. Disease is defined, not at an arbitrary point within the range of biological variation, but by the functional meaning of any disturbance for the whole organism. Health, for Canguilhem, 'means being able to fall sick and recover'. By contrast, 'to be sick is to be unable to tolerate change'. The history of medicine is replete with examples ('dropped stomach', 'dropped bowel', 'myotatic irritability') of misinterpreted normal variation¹⁴. Health and disease are

therefore distinct and separable human qualities, defined by human feelings and not merely by abstract loci within a frequency distribution.

Although Canguilhem views health and disease as different human qualities, he does not identify them as opposites. Given certain environments, pathological states can be normal adaptations:

The normal should not be opposed to the pathological, because under certain conditions and in its own way, the pathological is normal.

Even pathological conditions have norms:

From the biological, social, and psychological points of view, a pathological state is never a state without norms—such a thing is impossible. Wherever there is life, there are norms⁵.

Hostile environments produce physiological effects that can have adverse consequences even though these effects are 'normal' responses to prevailing conditions. For instance, the progressive immunosuppression that follows infection with HIV is a normal response to that virus. Yet 'health' could conceivably be defined as the ability to tolerate that virus despite clear evidence of infection. Such a definition leads us to a far less negative view about the consequences of disease, a view that some have argued for strongly¹⁵.

THE CONTEMPORARY LEGACY OF CANGUILHEM

What does this qualitative notion of normality mean for modern ideas about disease? The most striking aspect of Canguilhem's writing is that he provides a sound biological and philosophical basis for reversing the relentless process of reductionism that characterizes recent biomedicine. His concern with qualities of individual feeling, rather than biochemical and cellular abnormalities expressed quantitatively, emphasizes the importance of context when evaluating illness. Context is critical because, according to Canguilhem, the environment defines one's state of health or disease through one's adaptability. An inability to tolerate and adapt to one's environment produces disease. The total environment now becomes an equal partner with the whole individual in understanding the genesis of illness.

In addition to challenging the mechanistic tendencies of medicine, Canguilhem draws attention to several other important countercurrents in medical thought. He identifies the huge gap between theory and practice, between the burgeoning scientific basis of medicine and the relatively slow progress of clinical practice and preventive public health. This discontinuity is all too well recognized today with the debates about how to translate research into practice and how best to use the mass of information we already possess¹⁶.

Moreover, the naïve belief that medicine is simply the application of biological knowledge to human beings is discounted by the vastly different pace of progress in research and clinical care. Medicine is not an applied science but more 'an evolving synthesis of applied sciences' that are further applied to humans. Scientific discoveries by themselves frequently have little to do with the practical needs of medicine. Indeed, 'Medicine is the science of the limits of the powers that the other sciences claim to confer upon it...'⁵.

Canguilhem's emphasis on concepts leads one today to see the scientific preoccupation with data, as opposed to the development of ideas, as a major reason why the gap between scientific research and practice has apparently widened in recent years. Conceptual poverty, a lack of hypotheses, in an era of unsurpassed experimental activity has produced a sense of impotence and frustration at the apparent weakness of science. This feeling is perhaps most keenly articulated by those in the HIV research community. Feeble clinical progress in particular fields of study leaves one questioning whether the concepts underlying that research are correct¹⁷.

Let me return to the question I posed in my introduction. The long-held view that disease originated from physiological dysfunction has now been partly superseded by the idea that disease derives from errors in semantic processing: i.e., misreading or mutation of DNA. As Canguilhem put it: 'there are bad readings of a haemoglobin just as there are bad readings of a manuscript'. The understanding of disease now becomes the understanding of error and the elimination of disease means deleting these errors. Doctors will all be editors one day. The clichéd fear of a 'genetic inquisition' to eradicate disease is real. For example, when discussing data showing that a common genetic variant of apolipoprotein E was associated with a high probability of developing late-onset Alzheimer's disease, Scott noted that these findings 'must provide the impetus for social and legislative change'¹⁸ He went on:

Our thinking about Alzheimer's disease cannot be the same again. We have to consider urgently what we should do about such discoveries. The ethical, legal, psychological, and social implications of this discovery must force us to a new responsibility.

His argument is clear, although he cannot quite bring himself to say it: we might now be able to eliminate this form of Alzheimer's disease if we only took one more step: prenatal identification and elimination of this genotype. The underlying weakness of this conclusion was commented on by others¹⁹. Yet if we accept 'normal' to mean a qualitative feeling of health and not merely a true reading of the genetic text, the assumption that eliminating particular genotypes is

a necessary means of preventing disease becomes less secure. How can one deny that a critical eye should *not* be cast over these contemporary assumptions?

Canguilhem foregrounds the subjective and qualitative nature of disease before the prevailing objective and quantitative notions that we now embrace. His thesis enjoys occasional support. For example, Gill and Feinstein have argued that quality-of-life estimates scored by the physician may produce a very different picture of the true quality of life of an individual when compared with that patient's personal assessment²⁰. Our attempts to objectify quality of life force individuals to conform to a set of criteria with which they may disagree.

CONCLUSION

Canguilhem's appeal to physicians to exercise their subjective judgement when evaluating disease might sound like nebulous anti-science to some readers. However, Canguilhem wrote as a doctor who was passionately committed to the enterprise of medicine. His war honors were given for operating a field hospital and evacuating patients under fire. He was no ivory tower philosopher and he offered neither a specific critique of the process of science nor a refutation of its factual progress. Rather, he believed that his task was to attack the view that a scientific method, claiming objectivity and mathematical certainty, is the only model for acquiring knowledge of disease. He saw that much of modern science is actually scientism and that many scientists believe that all realms of experience are amenable to mathematical interpretation.

Canguilhem described an alternative approach: to abandon all presuppositions about the nature of disease, to begin from one's immediate experience, and to adopt a purely descriptive method. Canguilhem asks us to examine the content of a patient's experience rather than to begin with a biological translation of that experience. If physicians begin by suspending their prevailing scientific ideologies about disease, they are more likely to discover the qualitative intentions of their patients' symptoms. To allow our conceptions about a 'disease' to be governed only by the amount of objective data that can account for that condition is to undermine the project of medicine. The conflict over the truth or falsity of Persian Gulf syndrome in the face of genuine subjective illness is a recent example²¹. We seek biological meaning, but that end-point may not be what our patients seek: indeed, it may be what they fear.

Add to this radically humanistic view of medicine the logic of Canguilhem's focus on concepts, i.e. that a conceptual famine affects much of modern clinical research, and we have a coherent and complementary methodology for medicine that deserves a place alongside scientism. Do we have the humility to accept the limitations of scientism's method? As a physician and philosopher, I suspect that Georges Canguilhem would hope so.

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